Quality of Life, Functioning, and Depressive Symptom Severity in Older Adults With Major Depressive Disorder Treated With Citalopram in the STAR*D Study

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ABSTRACT

Objective: Major depressive disorder (MDD) can substantially worsen patient-reported quality of life (QOL) and functioning. Prior studies have examined the role of age in MDD by comparing depressive symptom severity or remission rates between younger and older adults. This study examines these outcomes before and after SSRI treatment. On the basis of prior research, we hypothesized that older adults would have worse treatment outcomes in QOL, functioning, and depressive symptom severity and that nonremitters would have worse outcomes.

Methods: A retrospective secondary data analysis was conducted from the National Institute of Mental Health–funded Sequenced Treatment Alternatives to Relieve Depression (STAR*D) study (July 2001–September 2006). We analyzed data for 2,280 nonpsychotic adults with *DSM-IV-TR*–defined MDD who received citalopram monotherapy. Older adults were classified as adults aged 65 years and above. All subjects completed patient-reported QOL, functioning, and depressive symptom severity measures at entry and exit. Subjects included 106 older adults and 2,174 adults < 65. MDD remission status posttreatment was also determined.

Results: Both older adults and adults < 65 experienced significant improvements and medium to large treatment responses across QOL, functioning, and depressive symptom severity ($P < .001$). Older adults had smaller treatment effect sizes for all outcomes, particularly functioning. Conversely, mean change scores from entry to exit were equivalent across all outcomes. Remitters at exit had significantly better responses to treatment than nonremitters for the majority of outcomes.

Conclusion: Findings suggest that older adults and younger adults have comparable treatment responses to citalopram monotherapy, with significant improvements in patient-reported depressive symptom severity, functioning, and QOL.

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With 350 million people affected worldwide, depression is the leading cause of disability and the third leading contributor to disease.[1] The impact of depression extends beyond symptom severity, as depression has a significant impact on quality of life (QOL) and functioning.[2–4] QOL is defined as "an individual's or group's perceived physical and mental health over time,"[5] and functioning refers to an individual's ability to participate in activities given his or her health condition.[6]

Depression is a common condition among older adults (ie, adults aged ≥ 65), affecting up to 9.5% in private households and up to 42% among elderly living in institutional housing.[7] Within the United States, the population of adults ≥ 65 has grown over the past decade and will most likely continue to grow as life expectancy increases.[8] Because adults ≥ 65 are more commonly screened for depression in the context of care for comorbid medical illness or cognitive difficulties, they may be less likely than adults < 65 to receive pharmacologic treatment.[9]

Depression may also affect older adults differently than younger adults. In a preliminary analysis from the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) study, which examined sequential treatment trials for patients with major depressive disorder (MDD), it was revealed that 2 older cohorts (ages 51–65 and 66–75) experienced more major depressive episodes, longer durations of depressive symptoms, and later onset of first depressive episode than younger age groups.[10] Among older adults, depressive symptom severity is often accompanied by general medical problems, and somatization of psychiatric symptoms is frequent with increasing age.[11] Moreover, depression is the condition most strongly associated with poor QOL, and among older adults, the effects on QOL may be independent of physical comorbid illnesses.[12] Research also suggests that patients who perceive themselves as unhealthy may be less likely to recover from depression after treatment.[13] Thus, further research on depression, QOL, and functioning in older adults, as well as treatment of depression in older adults, is imperative.

Prior analyses of depressed adults ≥ 65 in the STAR*D study are limited and do not assess the impact of MDD on QOL and functioning or investigate the role of remission from MDD. In the current study, we compare QOL, functioning, and depressive symptom severity between older adults and those younger than 65. We hypothesize that (1) the adults < 65 group will exhibit better response to treatment and will have lower proportions of severely impaired QOL and functioning

Clinical Points

- While the scientific literature is mixed, older adults (aged ≥ 65) with major depressive disorder are presumed to have worse responses to SSRI monotherapy treatment, as measured by depressive symptom severity and functional impairments, compared with younger adults (aged < 65). Yet, no study to date has examined quality of life outcomes or the role of remission from depression in treatment response.
- As the number of aging adults with depression increases, it is crucial for clinicians to be aware of the impact of SSRI treatment efficacy in reducing symptom severity in older adults and of its impact on functioning and quality of life in this age group.
- Following citalopram monotherapy, there were no significant treatment response differences between older adults and younger adults for depressive symptom severity, functioning, or quality of life. Regardless of age, participants able to achieve remission from depression had significantly better exit outcomes in quality of life and functioning compared to nonremitters.

Table 1. Outcome Measures, Interpretation, and Scores for Quality of Life, Functioning, and Depressive Symptom Severity

Outcome Measure	Interpretation	Score
Quality of life		
Q-LES-Q = 0–100	Normal QOL	≥ 67
	Mild to moderately impaired QOL	> 55.7 to < 67
	Severely impaired QOL	≤ 55.7
SF-12 PCS = 0–100, and SF-12 MCS = 0–100	Normal QOL	≥ 40
	Mild to moderately impaired QOL	> 30 to < 40
	Severely impaired QOL	≤ 30
Functioning		
WSAS = 0–40	Normal functioning	< 10
	Mild to moderately impaired functioning	10–20
	Severely impaired functioning	> 20
Depression and remission		
QIDS-SR = 0–27	No depression	0–5
	Mild depression	6–10
	Moderate depression	11–16
	Severe depression	17–20
	Very severe depression	21–27
	Remission	≤ 5

Abbreviations: QIDS-SR = Quick Inventory of Depressive Symptomatology–Self Report, Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire, QOL = quality of life, SF-12 MCS = 12-item version of the Medical Outcomes Study Short Form–mental component scale, SF-12 PCS = 12-item version of the Medical Outcomes Study Short Form–physical component scale, WSAS = Work and Social Adjustment Scale.

compared with the adults ≥ 65 group and that (2) while patients in both groups will show significant improvements from entry to exit, those who achieve remission from MDD will have much better exit outcomes in QOL and functioning compared with nonremitters.

METHODS

Participants

To date, the STAR*D study (July 2001–September 2006) remains the largest and longest National Institute of Mental Health (NIMH)–funded study on treatment-seeking depressed outpatients (ClinicalTrials.gov identifier: NCT00021528). More detailed information on the STAR*D study has been reported previously.[14,15] Participants who were in remission at entry to Level 1 or missing complete entry and exit scores were excluded from data analyses. Level 1 of the STAR*D study employed a fixed-flexible dosing schedule for citalopram monotherapy with permitted modifications as needed based on treatment response. Our sample included 2,280 nonpsychotic adults (106 older adults aged ≥ 65 and 2,174 adults < 65) with *DSM-IV-TR*–defined MDD, who completed measures assessing QOL, functioning, and depressive symptom severity. In order to determine concurrent Axis I diagnoses,[15] the Psychiatric Diagnostic Screening Questionnaire was administered.[16,17] To conduct data analysis for the current study, we acquired a certificate from the NIMH to access and use the STAR*D Pub Ver3 dataset. None of the authors received any direct funding for the current study.

Measures

Table 1 lists all measures, scoring, and community norm designations applied in the current analysis. QOL was assessed with the 16-item Quality of Life Enjoyment and Satisfaction Questionnaire–Short Form (Q-LES-Q),[18] which is a self-reported measure that assesses enjoyment and satisfaction across several domains, with higher scores representing better QOL. The WHO[19] acquired community norms and found that the mean value of the Q-LES-Q was 78.3 (SD = 11.3). Scores that fall within 1 standard deviation of the community norms (scores ≥ 67) are defined as within-normal QOL. On the basis of previous literature supporting the use of the Q-LES-Q,[20] scores greater than 2 standard deviations below the mean (scores ≤ 55.7) are classified as severely impaired QOL.[21] The Q-LES-Q has sturdy psychometric properties (Cronbach α = 0.90; test-retest reliability, $r = 0.74$).[18]

QOL was also assessed using the SF-12, a 12-item short-form questionnaire examining various aspects of QOL from the Medical Outcomes Study.[22,23] The SF-12 consists of 2 factors—a physical component scale (PCS) and a mental component scale (MCS). For both the MCS and PCS, within normal is defined as within 1 SD of community norms. Since community norm samples have a mean score of 50 (SD = 10) for both the PCS and MCS, SF-12 scores ≥ 40 on these scales are considered within-normal ranges. For both the MCS and PCS, severely impaired is defined as scores greater than 2 SD below the community norms; SF-12 scores < 30 for the PCS or MCS are considered severely impaired.

To assess functioning, the Work and Social Adjustment Scale[24] (WSAS) was chosen due to its strong psychometric properties (Cronbach α range, 0.70–0.94; test-retest reliability, $r = 0.73$). Scores on the WSAS range from 0 (best possible functioning) to 40 (worst possible functioning). Previous work has operationalized WSAS scores < 10 as within-normal and scores ≥ 20 as severely

impaired. The WSAS has been validated in different populations[25] to assess functioning in patients with depression, chronic fatigue syndrome, and obsessive-compulsive disorder. However, studies of the scale's psychometric properties in adults ≥ 65 have been less documented.

To quantify depressive symptom severity, the Quick Inventory of Depressive Symptomatology–Self Report[26] (QIDS-SR) was selected due to its high internal consistency (Cronbach α = 0.86) and convergent validity with the clinician-rated Hamilton Depression Rating Scale[27] and the Beck Depression Inventory-II.[28] The range of scores for the QIDS-SR is between 0 (no depression) and 27 (severe depression), where remitters are defined as QIDS-SR scores ≤ 5 posttreatment and nonremitters as > 5 posttreatment.[26]

Table 2. Demographic Characteristics of Patients Diagnosed With Major Depressive Disorder in Phase 1 of the STAR*D Study With Complete Quality of Life, Functioning, and Depressive Symptom Severity Data

Characteristic	All (N = 2,280)	Adults ≥ 65 (n = 106)	Adults < 65 (n = 2,174)	*P*
Age, y				
Range	18.1–75.6	65.0–75.6	18.1–64.9	…
Mean (SD)	42.6 (13.0)	69.2 (3.0)	41.3 (11.9)	< .001
Female, n (%)	1,431 (62.8)	60 (56.6)	1,371 (63.1)	.178
White, n (%)	1,846 (81.0)	89 (84.0)	1,757 (80.8)	.422
College graduate, n (%)	685 (30.0)	31 (29.2)	654 (30.1)	.849
Employed, n (%)	1,301 (57.1)	37 (34.9)	1,264 (58.1)	< .001
Living with spouse/partner, n (%)	1,046 (45.9)	48 (45.3)	998 (45.9)	.896
Score at entry, mean (SD)				
QIDS-SR	15.6 (4.8)	13.2 (4.5)	15.8 (4.8)	< .001
Q-LES-Q	41.5 (14.2)	48.6 (12.6)	41.1 (14.2)	< .001
SF-12 PCS (QOL)	49.5 (12.1)	45.2 (11.7)	49.7 (12.1)	< .001
SF-12 MCS (QOL)	26.1 (8.3)	31.5 (9.1)	25.9 (8.1)	< .001
WSAS	23.8 (8.9)	20.7 (8.8)	24.0 (8.8)	< .001

Abbreviations: STAR*D = Sequenced Treatment Alternatives to Relieve Depression study. See Table 1 for all other abbreviation definitions.
Symbol: … = not applicable.

Table 3. Change in Scores on Measures of Depressive Symptom Severity (QIDS-SR), Quality of Life (QOL), and Functioning (WSAS)

Measure	No. of Subjects	Entry Score, Mean (SD)	Exit Score, Mean (SD)	Change, Mean (SD)	*P* Value[a]	Effect Size[b]
Severity: QIDS-SR						
All	2,280	15.6 (4.8)	9.5 (6.5)	−6.1 (6.5)	< .001	1.05
Adults ≥ 65	106	13.2 (4.5)	8.6 (4.9)	−4.6 (5.2)	< .001	0.97
Adults < 65	2,174	15.8 (4.8)	9.6 (6.6)	−6.2 (6.5)	< .001	1.05
Significance[c]	…	*< .001*	*.146*	*.013*	…	…
Quality of life						
Q-LES-Q						
All	2,280	41.5 (14.2)	56.6 (21.9)	15.1 (19.4)	< .001	0.78
Adults ≥ 65	106	48.6 (12.6)	60.4 (18.6)	11.8 (16.7)	< .001	0.71
Adults < 65	2,174	41.1 (14.2)	56.4 (22.1)	15.2 (19.5)	< .001	0.79
Significance[c]	…	*< .001*	*.068*	*.071*	…	…
SF-12 PCS						
All	2,280	49.5 (12.1)	48.2 (11.4)	−1.4 (7.9)	< .001	0.11
Adults ≥ 65	106	45.2 (11.7)	44.4 (10.7)	−0.9 (7.8)	.259	0.08
Adults < 65	2,174	49.7 (12.1)	48.4 (11.4)	−1.4 (7.9)	< .001	0.12
Significance[c]	…	*< .001*	*< .001*	*.514*	…	…
SF-12 MCS						
All	2,280	26.1 (8.3)	39.9 (13.3)	13.7 (14.0)	< .001	1.22
Adults ≥ 65	106	31.5 (9.1)	42.3 (12.5)	10.8 (11.4)	< .001	0.96
Adults < 65	2,174	25.9 (8.1)	39.8 (13.3)	13.9 (14.1)	< .001	1.24
Significance[c]	…	*< .001*	*.057*	*.025*	…	…
Functioning: WSAS						
All	2,280	23.8 (8.9)	15.5 (12.1)	−8.3 (11.2)	< .001	0.77
Adults ≥ 65	106	20.7 (8.8)	14.8 (10.6)	−5.9 (9.5)	< .001	0.53
Adults < 65	2,174	24.0 (8.8)	15.5 (12.2)	−8.4 (11.3)	< .001	0.78
Significance[c]	…	*< .001*	*.539*	*.021*	…	…

[a]Within-group significance values from entry to exit.
[b]Effect sizes with Dunlap correction.[32]
[c]*Significance* = *P* values of between-group comparisons.
Abbreviations: See Table 1 for abbreviation definitions.
Symbol: … = not applicable.

Data Analysis

All raw scores (Q-LES-Q, QIDS-SR, SF-12 PCS and MCS, and WSAS) were normally distributed within each group; therefore, analysis methods were selected based on normality assumptions for continuous variables. All between-group comparisons were conducted using independent samples *t* tests, and all within-group comparisons were conducted using paired samples *t* tests. Analyses of covariance (ANCOVAs) controlling for baseline depression scores were also conducted for each outcome measure at exit. Effect size *d*, based on the method developed by Cohen, was also reported, where values represent small (0.2), medium (0.5), and large (0.8) effects.[29–31] While Cohen *d* values assessed treatment effects from pretreatment to posttreatment, Equation 3 from Dunlap and colleagues[32] was used to correct Cohen *d* for correlated designs. To assess group differences in patient proportions, a χ^2 test, or Fisher exact test when necessary (n ≤ 5 per cell), was utilized. A McNemar test for related proportions was employed to compare within-group entry to exit frequencies. An adjusted 0.01 significance level was used for all outcome variables to correct for the number of statistical tests applied. All analyses were conducted with SPSS (IBM Statistical Package for the Social Sciences).[33]

RESULTS

Participant Demographics

The demographic characteristics of the patient sample can be found in Table 2. Most patients were white (81.0%) and almost two-thirds were female (62.8%). Demographic comparison between groups revealed no significant differences between the adults ≥ 65 group and the adults < 65 group in sex, ethnicity, educational attainment, or status of living with a spouse or partner. At entry level, there were significant group differences for depressive symptom severity, QOL, and functioning.

Between-Group and Within-Group Comparisons of QOL, Functioning, and Depressive Symptom Severity

Between-group and within-group changes in QOL, functioning, and depressive symptom severity scores before and after treatment are presented in Table 3. All groups showed statistically significant ($P < .001$) within-group improvements from pretreatment to

Table 4. Proportion of Patients Scoring Within Normal or Severely Impaired in Quality of Life (Q-LES-Q) and Functioning (WSAS) Before and After Treatment

Measure	No. of Subjects	Entry %	Exit %	McNemar Test *P* Value[a]
Within Normal				
Quality of life				
Q-LES-Q[b]				
All	2,280	3.2	34.0	<.001
Adults ≥65	106	4.7	37.7	<.001
Adults <65	2,174	3.1	33.8	<.001
Significance[c]	…	*.387*	*.408*	…
SF-12 PCS[d]				
All	2,280	74.7	75.0	.819
Adults ≥65	106	58.5	62.3	.514
Adults <65	2,174	75.5	75.6	>.999
Significance[c]	…	*<.001*	*.002*	…
SF-12 MCS[d]				
All	2,280	5.8	47.3	<.001
Adults ≥65	106	17.9	58.5	<.001
Adults <65	2,174	5.2	46.8	<.001
Significance[c]	…	*<.001*	*.018*	…
Functioning: WSAS[e]				
All	2,280	6.7	38.5	<.001
Adults ≥65	106	10.4	36.8	<.001
Adults <65	2,174	6.5	38.6	<.001
Significance[c]	…	*.116*	*.713*	…
Severely Impaired				
Quality of life				
Q-LES-Q[f]				
All	2,280	85.6	50.5	<.001
Adults ≥65	106	70.8	40.6	<.001
Adults <65	2,174	86.3	50.9	<.001
Significance[c]	…	*<.001*	*.037*	…
SF-12 PCS[g]				
All	2,280	8.5	9.8	.019
Adults ≥65	106	8.5	7.5	>.999
Adults <65	2,174	8.5	9.9	.014
Significance[c]	…	*>.999*	*.421*	…
SF-12 MCS[g]				
All	2,280	71.4	29.0	<.001
Adults ≥65	106	44.3	18.9	<.001
Adults <65	2,174	72.7	29.5	<.001
Significance[c]	…	*<.001*	*.019*	…
Functioning: WSAS[h]				
All	2,280	65.8	36.2	<.001
Adults ≥65	106	49.1	33.0	.002
Adults <65	2,174	66.6	36.4	<.001
Significance[c]	…	*<.001*	*.484*	…

[a]McNemar Test *P* value = Within-group significance values from entry to exit.
[b]Within Normal is defined as Q-LES-Q scores within 1 SD of community norms. Since community norm samples have a mean Q-LES-Q of 78.3 (SD = 11.3), a Q-LES-Q score ≥67 is considered Within Normal.
[c]*Significance* = *P* values of between-group comparisons.
[d]Within Normal is defined as SF-12 scores within 1 SD of community norms. Since community norm samples have a mean score of 50 (SD = 10) for both the SF-12-PCS and SF-12-MCS, SF-12 scores for the PCS or MCS ≥40 are considered Within Normal.
[e]Within Normal is defined as WSAS scores of less than 10.
[f]Severely Impaired is defined as Q-LES-Q scores greater than 2 SD below the community norms. Since community norm samples have a mean Q-LES-Q of 78.3 (SD=11.3), a Q-LES-Q score ≤55.7 is considered Severely Impaired.
[g]Severely Impaired is defined as scores greater than 2 SD below the community norms. Since community norm samples have a mean score of 50 (SD=10) for both the SF-12-PCS and SF-12-MCS, SF-12 scores <30 are considered Severely Impaired.
[h]Severely Impaired is defined as WSAS scores of more than 20.
Abbreviations: See Table 1 for abbreviation definitions.
Symbol: … = not applicable.

posttreatment and medium to large effect sizes in all measures at exit, except for SF-12 PCS scores. At entry, adults ≥65 consistently reported better QOL and functioning than adults <65 but lower treatment efficacy with less improvement from entry to exit, as indicated by smaller effect sizes. Other than the SF-12 PCS, there were no significant between-group differences at exit; an ANCOVA controlling for baseline depressive symptom severity scores was also conducted on each outcome measure at exit and revealed similar findings. The largest effect sizes were observed in depressive symptom severity reductions and in scores on the SF-12 MCS. Other than the SF-12 PCS, treatment effect sizes across all outcomes ranged from medium to large, reflecting substantial clinical relevance.

Proportions of Patients With Within-Normal and Severely Impaired QOL and Functioning Before and After Treatment

The proportions and between-group differences of patients scoring within-normal and severely impaired QOL and functioning at entry and exit are presented in Table 4. The proportions of patients with within-normal QOL at exit significantly increased for adults ≥65 ($P<.001$) and adults <65 ($P<.001$). The proportion of patients with within-normal functioning significantly increased for adults ≥65 ($P<.001$) and adults <65 ($P<.001$). The only nonsignificant change from treatment was in the SF-12 PCS scores. Notably, other than physical QOL (SF-12 PCS), for which the adults ≥65 had significantly lower proportions of patients with within-normal scores, there were no significant between-group differences in the proportion of participants with within-normal scores for QOL or functioning. The proportions of patients with severely impaired QOL at exit significantly decreased for both adults ≥65 and for adults <65 ($P<.001$). The adults <65 group also had significantly greater proportions of patients with severely impaired QOL and functioning at entry for the Q-LES-Q, SF-12 MCS, and WSAS ($P<.001$) compared to adults ≥65. There were no significant between-group differences at exit.

Proportion of Remitters/Nonremitters With Within-Normal and Severely Impaired QOL and Functioning Before and After Treatment

The proportions of patients with within-normal and severely impaired QOL and functioning based on remission status at entry and exit were also examined, as seen in Table 5. In general, the remitters group had significantly higher proportions of patients with within-normal QOL and functioning scores at exit and significantly lower proportions of patients with severely impaired QOL and functioning at exit. There were, however, a few exceptions, which are displayed in Table 5.

DISCUSSION

The current study examined treatment responses to citalopram monotherapy for reducing depressive symptom severity and increasing QOL and functioning of patients

Table 5. Proportion of Remitters/Nonremitters Scoring Within Normal or Severely Impaired in Quality of Life and Functioning Before and After Treatment

	Remitters				Nonremitters				
Measure	No. of Subjects	Entry (%)	Exit (%)	McNemar Test *P* Value	No. of Subjects	Entry (%)	Exit (%)	McNemar Test *P* Value[a]	Difference at Exit χ^2 *P* Value
Within Normal									
Quality of life									
Q-LES-Q[b]									
All	812	5.7	76.0	<.001	1,468	1.8	10.8	<.001	<.001
Adults ≥65	31	6.5	77.4	<.001	75	4.0	21.3	.001	<.001
Adults <65	781	5.6	75.9	<.001	1393	1.7	10.3	<.001	<.001
Significance[c]	…	*.847*	*>.999*	…	…	*.156*	*.003*	…	…
SF-12 PCS[d]									
All	812	86.6	90.6	<.001	1,468	68.2	66.3	.071	<.001
Adults ≥65	31	67.7	80.6	.219	75	54.7	54.7	>.999	.015
Adults <65	781	87.3	91.0	.001	1393	68.9	66.9	.060	<.001
Significance[c]	…	*.005*	*.061*	…	…	*.010*	*.029*	…	…
SF-12 MCS[d]									
All	812	6.7	90.0	<.001	1,468	5.3	23.7	<.001	<.001
Adults ≥65	31	22.6	96.8	<.001	75	16.0	42.7	<.001	<.001
Adults <65	781	6.0	89.8	<.001	1393	4.7	22.7	<.001	<.001
Significance[c]	…	*.003*	*.354*	…	…	*<.001*	*<.001*	…	…
Functioning: WSAS[e]									
All	812	10.2	80.5	<.001	1,468	4.7	15.2	<.001	<.001
Adults ≥65	31	6.5	71.0	<.001	75	12.0	22.7	.057	<.001
Adults <65	781	10.4	80.9	<.001	1393	4.3	14.8	<.001	<.001
Significance[c]	…	*.761*	*.170*	…	…	*.007*	*.067*	…	…
Severely Impaired									
Quality of life									
Q-LES-Q[f]									
All	812	79.3	9.0	<.001	1,468	89.0	73.4	<.001	<.001
Adults ≥65	31	74.2	9.7	<.001	75	69.3	53.3	.017	<.001
Adults <65	781	79.5	9.0	<.001	1393	90.1	74.5	<.001	<.001
Significance[c]	…	*.497*	*.892*	…	…	*<.001*	*<.001*	…	…
SF-12 PCS[g]									
All	812	4.6	3.9	.487	1,468	10.6	13.1	.002	<.001
Adults ≥65	31	6.5	3.2	>.999	75	9.3	9.3	>.999	.432
Adults <65	781	4.5	4.0	.585	1,393	10.7	13.3	.002	<.001
Significance[c]	…	*.647*	*>.999*	…	…	*.848*	*.383*	…	…
SF-12 MCS[g]									
All	812	70.9	1.4	<.001	1,468	71.6	44.2	<.001	<.001
Adults ≥65	31	35.5	0.0	.001	75	48.0	26.7	.001	.001
Adults <65	781	72.3	1.4	<.001	1,393	72.9	45.2	<.001	<.001
Significance[c]	…	*<.001*	*>.999*	…	…	*<.001*	*.002*	…	…
Functioning: WSAS[h]									
All	812	54.7	3.2	<.001	1,468	71.9	54.5	<.001	<.001
Adults ≥65	31	25.8	3.2	.016	75	58.7	45.3	.052	<.001
Adults <65	781	55.8	3.2	<.001	1,393	72.6	54.9	<.001	<.001
Significance[c]	…	*.001*	*>.999*	…	…	*.009*	*.103*	…	…

[a]McNemar Test *P* value = within-group significance values from entry to exit.
[b]Within Normal is defined as Q-LES-Q scores within 1 SD of community norms. Since community norm samples have a mean Q-LES-Q of 78.3 (SD = 11.3), a Q-LES-Q score ≥67 is considered Within Normal.
[c]*Significance* = *P* values of between-group comparisons.
[d]Within Normal is defined as within 1 SD of community norms. Since community norm samples have a mean score of 50 (SD = 10) for both the SF-12-PCS and SF-12-MCS, SF-12 scores for the PCS or MCS ≥40 are considered Within Normal.
[e]Within Normal is defined as WSAS scores of less than 10.
[f]Severely Impaired is defined as Q-LES-Q scores greater than 2 SD below the community norms. Since community norm samples have a mean Q-LES-Q of 78.3 (SD = 11.3), a Q-LES-Q score ≤55.7 is considered Severely Impaired.
[g]Severely Impaired is defined as scores greater than 2 SD below the community norms. Since community norm samples have a mean score of 50 (SD = 10) for both the SF-12-PCS and SF-12-MCS, SF-12 scores <30 are considered Severely Impaired.
[h]Severely Impaired is defined as WSAS scores of more than 20.
Abbreviations: See Table 1 for abbreviation definitions.
Symbol: … = not applicable.

in Level 1 of the STAR*D study. There are a number of important findings with notable clinical implications and relevance. First, compared to the adults ≥65 group, the adults <65 group had a better response to treatment (as measured by treatment effect size). That said, it is important to note that the adults ≥65 group had lower depressive symptom severity scores at entry compared to the adults <65 group, which likely impacted the treatment effect sizes. Nonetheless, medium to large effect sizes were observed in QOL and functioning for both groups.

Some existing literature suggests that older adults should have similar treatment response rates to younger adults. However, findings from previous clinical trials may be attenuated by small sample sizes of older adults[34] or missing

comparison groups of adults < 65.[12,35,36] Prior STAR*D investigators identified distinct characteristics of depression between older adults and younger adults. Older patients (ages 51–75) in the STAR*D study generally endorsed a longer duration of illness, more MDD episodes, and a later age at onset for their first MDD episode.[10] These differences could have also impacted the findings in the current study.

We initially hypothesized worse treatment outcomes for older adults based upon the work of earlier STAR*D investigators[10] and other research studies. Specifically, 1 meta-analytic study reported that while antidepressants used as monotherapy are efficacious for late-life MDD (defined as age 55 and older), there appears to be no treatment efficacy found in studies that use age thresholds of 65 years and older.[37] Findings in the current study revealed statistically significant and clinically meaningful (Cohen d = 0.97) reductions in depressive symptom severity for adults ≥ 65. Yet, contrary to our hypothesis that older adults would have worse outcomes, which was partially indicated by lower treatment effect sizes, there were no significant between-group differences in mean change values from entry to exit, suggesting equivalent treatment responses. These results not only are promising, but also add to previously conflicting literature by suggesting that older adults are favorable candidates for citalopram monotherapy to target depressive symptom severity and increase QOL and functioning.

Conversely, at both entry and exit, the adults < 65 group had higher proportions of patients with severely impaired QOL and functioning and lower proportions of patients with within-normal QOL and functioning, with the exception of the QOL SF-12 physical component scale scores. While there were no significant group differences in the proportions of patients with within-normal or severely impaired scores at exit (with the exception of the SF-12 PCS within-normal scores), the adults < 65 group appears to be at greater risk of severe impairment in QOL and functioning. Future investigators should examine the multitude of factors that may account for these findings. Nonetheless, it is important to note that both adults < 65 and adults ≥ 65 had significant reductions in the proportions of individuals with severely impaired scores from entry to exit in QOL and functioning.

Finally, when we examined remitters and nonremitters, participants who achieved MDD remission at exit had much better outcomes in QOL and functioning. Although we cannot assign directionality to the effects of depressive symptom severity on QOL or functioning, we can conclude that citalopram monotherapy improved all outcomes for the majority of patients—a fairly well-established correlation in existing research on MDD patients, in that those who achieve remission have significantly greater improvements in QOL and functioning.[12,36]

This is the first study to examine QOL and functioning data of patients aged 65 or older in Level 1 of the STAR*D study. As previously mentioned, adults ≥ 65 had significantly lower depressive symptom severity than adults < 65 at entry but not at exit, even after controlling for baseline depression scores. The adults ≥ 65 group generally had worse physical QOL, as evidenced by the lower proportion of participants with within-normal SF-12 physical component scale scores, which was expected. However, while there were no statistically significant differences between the 2 groups, and while adults < 65 had greater treatment effect sizes, the adults < 65 did worse in comparison to the older adults. This became apparent when examining the proportion of participants with severe impairment across outcomes, both at entry and exit, demonstrating that adults < 65 generally had greater rates of impairment. The potential factors accounting for these findings are beyond the focus of this study, but future investigators are encouraged to look into this discrepancy. Our findings add to the literature, and previous STAR*D research efforts, by demonstrating that older adults had clinically meaningful and statistically significant improvements in QOL, functioning, and depressive symptom severity reduction.

Strengths and Limitations

The limitations of the STAR*D study have been described elsewhere[15] but briefly include lack of a placebo-controlled group, reliance on self-report measures, and lack of clinician and participant blinding. Additionally, studies have shown that older females are more likely to report and be predisposed to depression, which introduces another potential source of bias.[38,39] However, the study's drawbacks are mitigated to some extent by its conducting enrollment at a large number of both primary care and specialty mental health settings. In addition, the current study was a retrospective secondary data analysis, and the hypotheses were not specified in advance of the study. Thus, while our findings may help explain differences in outcomes of patients aged 65 and older compared to younger patients, our ability to identify causal links is constrained. An additional limitation is that the adults ≥ 65 group was relatively small (n = 106) compared to the large number of adults < 65 (n = 2,174). Nevertheless, these 2 groups were demographically similar and data were normally distributed. Furthermore, our analyses did not consider specific types of medical conditions that may have afflicted patients aged 65 and older and could have explained some variations in QOL, functioning, and response to citalopram monotherapy. More specific information on medical conditions beyond general Cumulative Illness Rating Scale scores was not provided in the STAR*D dataset.

The strengths of the STAR*D study include a large sample size, use of valid and reliable measures with robust psychometric properties, and participant recruitment methods that may be more representative of the general population.[40] The strengths of the current investigation include the analysis of QOL and functioning before and after citalopram monotherapy and the comparison of 2 different age groups, adults ≥ 65 and adults < 65.

CONCLUSION

In summary, adults ≥ 65 and adults < 65 experienced significant improvements from treatment across all outcomes.

Contrary to previous research, there does not appear to be a significant treatment response difference between adults ≥65 and adults <65 (with the caveat that baseline depression scores were lower for the adults ≥65 group), which provides new clinical information to clinicians and offers hope that older adults may benefit from citalopram monotherapy to treat depression, increase QOL, and improve functioning. Additionally, the current study suggests that QOL and functioning are accurate indicators for remission rates and that interventions designed to improve QOL and functioning are important in treating MDD.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Geriatric Psychiatry section. Please contact Helen Lavretsky, MD, MS, at hlavretsky@psychiatrist.com, or Gary W. Small, MD, at gsmall@psychiatrist.com.